BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

Claims

What is claimed is:

1. A flow-through capacitor comprising:
    a) a plurality of electrodes; and
    b) a first charge barrier located between two of said plurality of electrodes.

2. The flow-through capacitor of claim 1, wherein the charge barrier is characterized by low resistance-capacitance.

3. The flow-through capacitor of claim 1, wherein at least one of the electrodes is an anode and at least one of the electrodes is a cathode.

4. The flow-through capacitor of claim 1, wherein the charge barrier comprises a first semipermeable membrane.

5. The flow-through capacitor of claim 4, wherein said charge barrier further comprises a second semipermeable membrane, said first membrane being a cation exchange membrane and said second membrane being an anion exchange membrane.

6. The flow-through capacitor of claim 5, wherein the anion exchange membrane is proximal to the anode, and the cation exchange membrane is proximal to the cathode.

7. The flow-through capacitor of claim 6, wherein the position of the anion and cation exchange membranes relative to the electrodes are reversed by reversal of voltage polarity on the electrodes.

8. The flow-through capacitor of claim 5, wherein the electrode is operated in the charge cycles of opposite polarity, separated by discharge cycles.

9. The flow-through capacitor of claim 1, further comprising a flow channel.

10. The flow-through capacitor of claim 9, wherein the flow channel is formed by a spacer.

11. The flow-through capacitor of claim 9, further comprising a flow channel located between one of the electrodes and the first charge barrier.

12. The flow-through capacitor of claim 11, further comprising a second charge barrier and further containing a flow channel located between the first and second charge barriers.

13. The flow-through capacitor of claim 2, wherein the charge barrier is an electrically-conductive membrane with a low resistance-capacitance (RC) time constant material.

14. The flow-through capacitor of claim 13, wherein the capacitance of the charge barrier is less than 20 farads/gram.

15. The flow-through capacitor of claim 1, wherein the charge barrier is electrically connected to a first power supply, and at least one of the plurality of electrodes is electrically connected to a second power supply.

16. The flow-through capacitor of claim 1, wherein the charge barrier has a voltage and the electrode has a voltage, the charge barrier voltage being greater than the electrode voltage.

17. The flow-through capacitor of claim 5, wherein the charge barrier membranes are identically-charged semipermeable membranes, selected from the group consisting of cation exchange membranes and anion exchange membranes.

18. The flow-through capacitor of claim 1, wherein the capacitor comprises a series resistance of less than 50 ohm cm^2.

19. The flow-through capacitor of claim 1, wherein the capacitor has a series resistance to leakage ratio of greater than 100.

20. The flow-through capacitor of claim 1, wherein the electrodes within a cell of the capacitor are ionically insulated and connected electrically in series.

21. The flow-through capacitor of claim 20, further comprising a flow path adjacent to each of the electrodes.

22. A system comprising the flow-through capacitor of claim 1 and a valve.

23. The system of claim 22, wherein said valve is a feedback valve.

24. The system of claim 22, wherein said valve is a three-way valve.

25. The system of claim 22, comprising a means for allowing fluid in said system to bypass a flow-through capacitor in said system.

26. The system of claim 22, comprising a means for directing fluid in said system from said flow-through capacitor to a second flow-through capacitor in said system.

27. The system of claim 22, further comprising a means for monitoring the concentration of ions in a fluid in said system.

28. The system of claim 22, further comprising a means for controlling the concentration of ions in a fluid in said system.